WHAT IS CLAIMED IS:

1. A micromachined device for receiving and retaining a liquid droplet at a desired site, the device comprising:

a substrate having an upper surface; and

a three-dimensional, thin film well patterned at the upper surface of the substrate wherein the well is capable of receiving and retaining a known quantity of liquid at the desired site through surface tension.

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2. A micromachined device for receiving and retaining at least one liquid droplet at a desired site, the device comprising:

a substrate having an upper surface;

a first three-dimensional, thin film well patterned at the upper surface of the substrate wherein the first well is capable of receiving and retaining a first known quantity of liquid at the desired site through surface tension; and

a second three-dimensional, thin film well patterned at the upper surface of the substrate wherein the second well is patterned outside and concentric to the first well wherein the second well is capable of receiving and retaining a second known quantity of liquid at the desired site through surface tension.

3. A micromachined device for receiving and retaining a plurality of separate liquid droplets at desired sites, the device comprising:

a substrate having an upper surface; and

an array of three-dimensional, thin film wells patterned at the upper surface of the substrate wherein each of the wells is capable of receiving and retaining a known quantity of liquid at one of the desired sites through surface tension.

4. A micromachined device for receiving and retaining a plurality of separate liquid droplets at desired sites, the device comprising:

a substrate having an upper surface;

a first array of three-dimensional, thin film wells patterned at the upper surface of the substrate wherein each of the wells is capable of receiving and

retaining a known quantity of liquid at one of the desired sites through surface tension; and

a second array of three-dimensional, thin film wells patterned at the upper surface of the substrate wherein each well of the second array of wells is patterned outside and concentric to one well of the first array of wells to receive and retain a second known quantity of liquid at the desired site through surface tension.

5. The device as claimed in claim 3 wherein each of the wells is a ring.

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6. The device as claimed in claim 3 wherein the device is a microsensor and wherein each of the desired sites is a sensing site.

7. The device as claimed in claim 6 wherein the microsensor is a solid-state, liquid chemical sensor.

8. The device as claimed in claim 6 wherein the microsensor is a gas sensor.

9. The device as claimed in claim 6 wherein the microsensor is an optical sensor.

10. The device as claimed in claim 3 wherein the device is a biomedical test plate.

11. The device as claimed in claim 3 wherein each of the wells is made of a photo-patternable material.

12. The device as claimed in claim 11 wherein the photo-patternable material is a negative photo-patternable material.

13. The device as claimed in claim 12 wherein the negative photo-patternable material is a polymer.

14. The device as claimed in claim 13 wherein the polymer is a polyimide.

15. The device as claimed in claim 12 wherein the negative photo-patternable material is an epoxy.

16. The device as claimed in claim 15 wherein the epoxy is SU8.

17. The device as claimed in claim 3 wherein the substrate is a semiconductor substrate.

18. The device as claimed in claim 17 wherein the semiconductor substrate includes a silicon wafer.

19. The device as claimed in claim 18 wherein the semiconductor substrate further includes a layer of insulating material on which the wells are patterned.

20. The device as claimed in claim 3 wherein the substrate is made of a material other than a semiconductor material.

21. The device as claimed in claim 3 wherein the device is a potentiometric liquid chemical sensor and wherein each desired site is a sensing site.

22. The device as claimed in claim 3 wherein the device is an integrated ion sensor and wherein each desired site is a sensing site.

23. The device as claimed in claim 3 wherein each of the wells includes a side wall having an outside corner with a small radius to prevent its liquid droplet from flowing down outside the side wall.

24. A method of making a micromachined device which is capable of receiving and retaining at least one liquid droplet, the method comprising:

providing a substrate having a layer of radiation-sensitive material formed thereon; and

patterning at least one three-dimensional, thin film well from the layer of material wherein the at least one well is capable of receiving and retaining a known quantity of liquid through surface tension.

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25. The method as claimed in claim 24 further comprising patterning a three-dimensional, thin film well from the layer of material outside and concentric to the at least one well at the same time as patterning the at least one well.

26. The method as claimed in claim 24 wherein the layer of material is photo-patternable.

27. A method of using the device as ~~claimed in claim 1~~, the method comprising:

dispensing a membrane solution droplet into the well.

28. The method as claimed in claim 27 wherein the membrane solution is a polymeric membrane solution.

29. The method as claimed in claim 27 wherein the membrane solution is an aqueous solution.

30. The method as claimed in claim 27 wherein the membrane solution is a solvent-based solution.

31. The method as claimed in claim 27 wherein the membrane is an optical membrane.

32. A method of using the device as claimed in claim 2, the method comprising:

dispensing a first membrane solution droplet into the first well; and

dispensing a second membrane solution droplet over the first membrane solution droplet and into the second well.

33. The method as claimed in claim 32 wherein the first membrane solution is an internal filling solution.

34. The method as claimed in claim 32 wherein the second membrane solution is an external binding layer.

35. The method as claimed in claim 32 wherein the second membrane solution has enzymes, antibodies or functional groups trapped therein.

36. A method of using the device as claimed in claim 3, the method comprising:

dispensing a membrane solution droplet into each of the array of wells.

37. A method of using the device as claimed in claim 4, the method comprising:

dispensing a first membrane solution droplet into each of the first array of wells; and

dispensing a second membrane solution droplet over each of the first membrane solution droplets and into each of the second array of wells.

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